
Hoya ignorata (Apocynaceae, Asclepiadoideae):
An Overlooked Species Widely Distributed across Southeast Asia

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ABSTRACT. A new species, *Hoya ignorata* T. B. Tran, Rodda, Simonsson & Joongku Lee (Apocynaceae, Asclepiadoideae) is described and illustrated from Vietnam. The new taxon, widely distributed in Southeast Asia, does not seem to be related to any previously described *Hoya* R. Br., due to its small cupular coronas lacking lobes, and pendulous pollinia. These morphological characters, new for the genus *Hoya*, are discussed in light of the recent broadening of the circumscription of the genus following the results of molecular phylogenies and morphological studies.

Key words: Apocynaceae, *Hoya*, IUCN Red List, Malaysia, Sabah, Thailand, Vietnam.

The genus *Hoya* R. Br. (Apocynaceae, Asclepiadoideae) comprises approximately 200 species distributed from India across Southeast Asia and the Pacific Islands (Li et al., 1995). The plants are often used for ornamental purposes and are popular because of their beautiful and fragrant flowers. The new species, described herein, was first identified among the collections from dry forests of Dak Mil, Dak Lak Province, Vietnam. Twenty-one species of *Hoya* have been recognized for Vietnam (Costantin,

1912; Ho, 1993; Li et al., 1995; Tran, 2005, Rodda et al., in prep.). Following field and herbarium-based studies it was also found in other localities in Vietnam, Peninsular Malaysia, Sabah, and Thailand. Peninsular Malaysia contains 26 *Hoya* species (Rintz, 1978, Kiew, 1989). Thailand is rich in *Hoya* species, with ca. 40 taxa (Thaithong, 2001); Borneo is still little explored (Forster et al., 1998), but recent research reveals that many new species still await description (Rodda & Nyhuus, 2009; Rodda et al., 2011; Rodda & Simonsson, 2011a, 2011b). *Hoya* has been recircumscribed following molecular and morphological studies, and its morphological boundaries have been greatly expanded (Wanntorp et al., 2006a, 2006b, 2011; Wanntorp & Forster, 2007, 2009; Wanntorp & Meve, 2011). Rare morphologies such as nonclimbing habit (Simonsson & Rodda, 2009; Rodda & Simonsson, 2011b) and extremely minute flowers (Rodda & Simonsson, 2010) have also been recently observed in an increasing number of species. Despite the peculiar morphology illustrated below, we describe the new species as *H. ignorata* T. B. Tran, Rodda, Simonsson & Joongku Lee. We discuss the novel characters this new species introduces to the genus *Hoya*.

Hoya ignorata T. B. Tran, Rodda, Simonsson & Joongku Lee, sp. nov. TYPE: Vietnam. Dak Lak: Dak Mil, 11 Dec. 1979, L. K. Bien 1072 (holotype, HN; isotype, MO). Figures 1, 2.

Haec species ab omnibus congeneris corona parva cupulata elobata atque polliniis pendulis distinguitur.

Plants erect or decumbent, epiphytic shrub, glabrous on all parts, 30–50(100) cm; leafy stems 1–3 mm diam., older stems to 10 mm diam.; internodes 2.8–5 cm. Leaves opposite, sessile, coriaceous, petiole ca. 1 mm; lamina entire; leaf blade ovate, lanceolate-oblong or oblong with wavy margins, 3–7 × 1–3 cm; base acuminate to round; apex acuminate-apiculate; secondary veins in 4 to 8 pairs on each side of midrib, obscure, diverging from the midrib at ca. 90°. Inflorescences extra-axillary, hidden beneath foliage, concave to convex, often with congested flowers, to 20-flowered, lasting ca. 7 days in cultivation; peduncle 5–16 × 1.5–2 mm; pedicels filiform, 3–6 × 1 mm. Flowers 2–2.8 mm diam., ca. 6 mm diam. when flattened; calyx lobes broadly ovate to nearly round, 0.9–1 × 0.8–0.9 mm, apex and base rounded; corolla revolute, fleshy, pale yellow to bright orange-red; corolla lobes triangular, 2.5 × 1 mm, apex acute to acuminate; corona staminal, cupular, fleshy, 2 mm diam., 0.8 mm high, pale yellow to bright orange-red, lacking corona lobes; guide rail prominent, forming a ridge along the corona but extremely reduced; stigma convex, depressed; pollinaria presenting pendulous pollinia, retinaculum extremely small, 100 × 30 µm held on the prominent tip of the guide rail with basally attached caudicles, ribbon-shaped, 400 × 15 µm, connected to 2 round to ovoid pollinia, 350 × 250 µm, positioned at the center of the flower just above the style head; ovary bicarpellate, bottle-shaped, ca. 1 mm long. Follicles thin, ca. 4 × 0.5 cm, seeds comose, spindle-shaped, 4–5 × 1 mm.

Distribution and habitat. *Hoya ignorata* is an epiphyte found in strikingly different environments across Southeast Asia. It was found in Nghê An Province in northern Vietnam to as far south as Nabawan, Sabah. The information on its habitat was gathered from type specimens Bien 1072 (holotype/isotype) and Corner 30279 (paratype), and from recent field observations in Vietnam, Thailand, and Sabah. The type was collected in Dak Lak Province in seasonally dry forest. Also, the taxon was recently collected in Hue, Vietnam (Pham Van The, pers. comm.). In Peninsular Malaysia it was collected growing on *Ochanostachys amentacea* Mast. (Olacaceae), a small tree common in primary forests in

Malaysia, at ca. 150 m.s.m. The Thai collections are from primary forests in Nakhon Si Thammarat Province at 800 m.s.m. (five individuals on separate trees and one vine) and Songkhla Province (three on individual small trees) at 150 m.s.m., both in dense forest near streams and often very hard to distinguish from the host tree or vine. In Sabah, the species was observed as four specimens growing on a single unidentified tree about 6 m high in lowland primary heath forest dominated by *Dacrydium pectinatum* De Laub. (Podocarpaceae) and *Tristaniopsis* Brogn. & Gris (Myrtaceae). *Hoya ignorata* appears to be surprisingly adaptable to a wide range of environments and forest types, and it is probably much more common than so far known, but rarely collected due to its epiphytic habit and its inconspicuous flowers. Further, it appears to be restricted to primary forest habitats only.

IUCN Red List category. *Hoya ignorata* should be considered Least Concern (LC) according to IUCN Red List criteria (IUCN, 2001). *Hoya ignorata* is known from a vast distributional area spanning from Vietnam to Sabah in Malaysia.

Phenology. *Hoya ignorata* has been observed to flower in December in Dak Lak, and in May in Nghê An (Vietnam), Nakhon Si Thammarat (Thailand), Songkhla (Thailand), and Nabawan, Sabah (Malaysia).

Etymology. The epithet of the new species is derived from the fact that it is easily overlooked both in herbaria and in the field. Its oldest known specimen, J. F. Fleury 32504 (P), remained unidentified for more than 100 years. In its natural habitat *Hoya ignorata* grows as an epiphyte and can be easily confused with a host tree branch (Fig. 1C, D). Further, its inconspicuous flowers may be difficult to observe when the plants grow high in the tree canopy.

Notes. This taxon has long been known from herbarium materials. First collected by Fleury in Nghê An, Vietnam, in 1914, then by Corner in Peninsular Malaysia in 1934, and again by Bien in Dak Lak, Vietnam, in 1979, these collections remained undetermined until recently. Due to the small size of the flowers and the impossibility to determine their tri-dimensional shape from rehydrated materials, we were fortunate when specimens were collected in Thailand in 2010 and in Vietnam in 2011, and surprisingly in Sabah, Malaysia, which allowed living materials to be measured and photographed for detailed illustration.

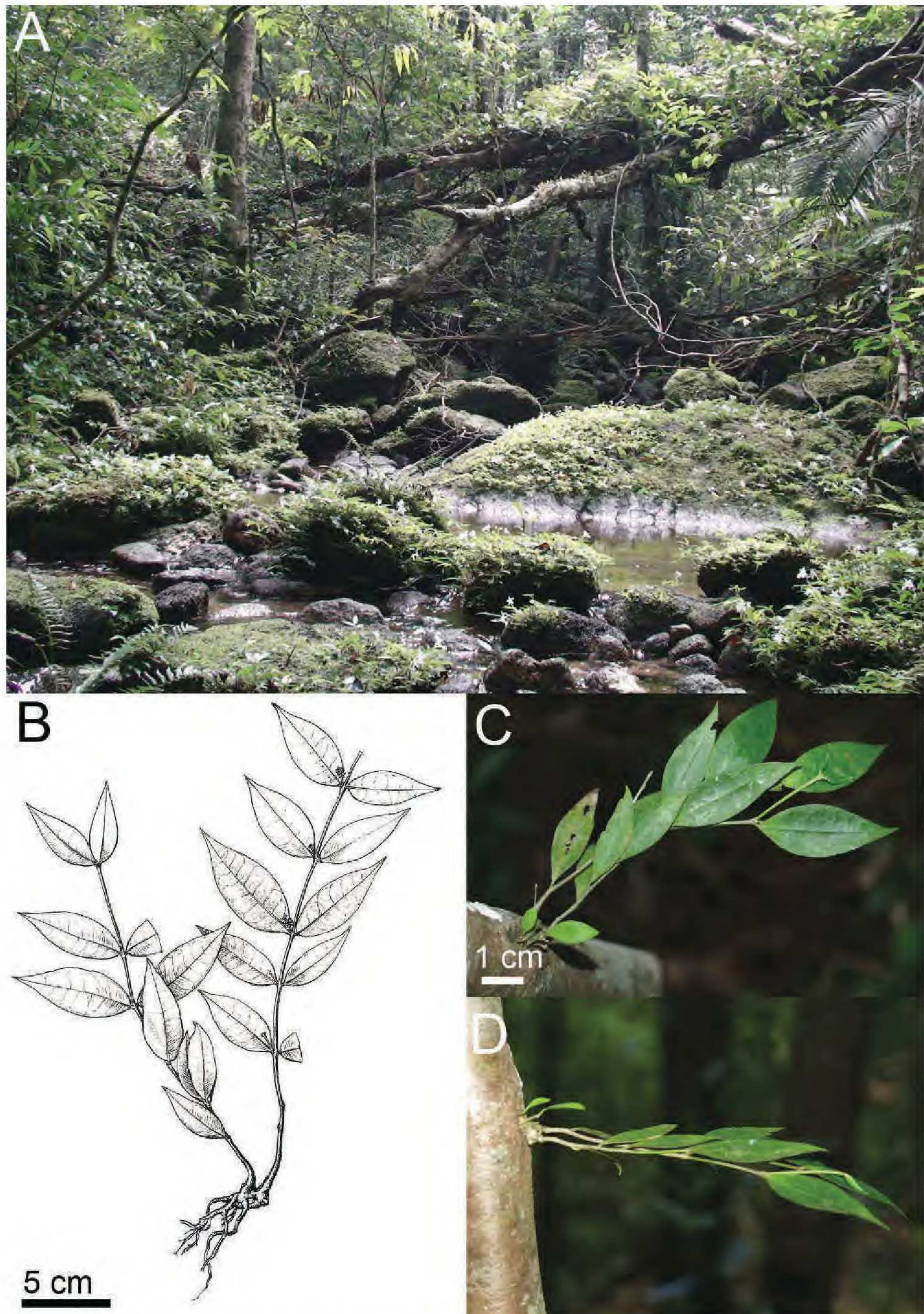


Figure 1. *Hoya ignorata* T. B. Tran, Rodda, Simonsson & Joongku Lee. —A. Habitat in Khao Luang, Thailand, associated with paratypes Simonsson & Somadee NS10-004, NS10-007 (SING). Photo by N. Simonsson. —B. Mature specimen, drawn from the holotype L. K. Bien 1072 (HN) collected from Dak Lak, Vietnam. —C, D. Habit photographs of the new species in Nabawan, Sabah, Malaysia (photos by M. Rodda).

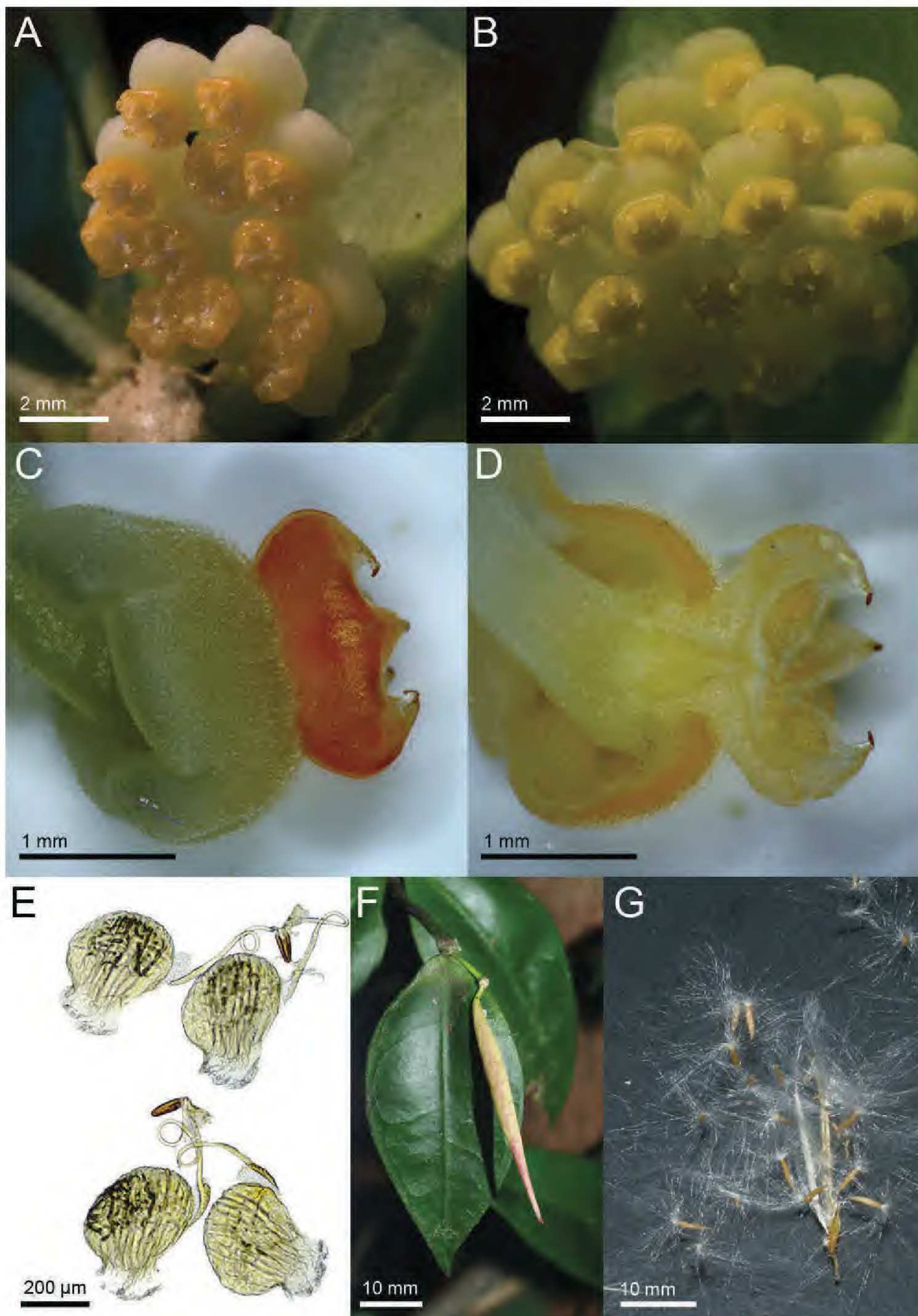


Figure 2. *Hoya ignorata* T. B. Tran, Rodda, Simonsson & Joongku Lee. —A. Convex inflorescence (Simonsson & Somadee NS10-007, SING). —B. Inflorescence with congested flowers (Simonsson & Somadee NS10-004, SING). —C. Lateral view of a single flower (Simonsson & Somadee NS10-007, SING). —D. Longitudinal section of a flower with evident retinacula and depressed stigma. —E. Pollinaria. —F. Follicle (M. Rodda & L. Gokusing MR11-056, SING). —G. Seeds (M. Rodda & L. Gokusing MR11-056, SING).

Discussion. It became immediately apparent that the taxon was either a new genus closely related to *Hoya* or a very peculiar new species of *Hoya*. *Hoya* is assigned to tribe Marsdenieae within the Apocynaceae. The Marsdenieae cannot be separated from other tribes due to synapomorphies, but its distinguishing characters are recognized as the longitudinal dehiscence of the thecae, the presence of erect or ascending pollinia and anthers with membranous terminal appendages (Omlor, 1996). Within Marsdenieae, *Hoya* belongs to a group described by Omlor (1996) as the *Hoya* group; its members are herbaceous vines or climbing or dependent epiphytes with often fleshy leaves and perennial pseudo-umbelliform inflorescences that produce flowers for several seasons. The corona is staminal and has lobes that often spread horizontally, and generally consist of an inner tip that is appressed to the anthers and a variable outer part with revolute lateral margins. The seeds are comose and spindle-shaped and lack differentiated margins, and the pollinia have a conspicuous, pellucid germination zone on their outer margin (Schill & Dannenbaum, 1984). This species group is separated from the natural core of Marsdenieae, which consists of woody perennial lianas or twining shrubs with simple staminal coronas (rarely a corolline corona), undifferentiated, erect, elongated pollinia, and flattened, comose, sometimes broadly margined, smooth seeds (Omlor, 1996). Following molecular investigations (Wanntorp et al., 2006a, 2006b, 2011) it became apparent that *Hoya* had to be recircumscribed and also include the monotypic genera *Absolmsia* Kuntze, *Madangia* P. I. Forst., Liddle & I. M. Liddle, and *Micholitzia* N. E. Br., and the two species of *Clemensiella* (Schltr.) Schltr. (Wanntorp & Forster, 2007; Wanntorp & Kunze, 2009; Meve et al., 2010; Wanntorp & Meve, 2011). To determine whether *H. ignorata* was indeed a *Hoya*, we examined morphological characters that identified genera now included in *Hoya* that were once separately considered. In *Absolmsia* this is the lack of leaves, in *Madangia*, the presence of a revolute basal skirt on the corona lobe and the urceolate corolla, and in *Micholitzia*, the small, urceolate corolla. Wanntorp and Forster (2007) clarified how these characters are shared with other *Hoya* species and did not justify the separation as different genera. Similarly, *C. mariae* (Schltr.) Schltr. was found to belong to *Hoya* (Wanntorp et al., 2011), despite bearing fleshy coronas with valvate lobes and clavate pollinia without pellucid margins, small and narrow retinacula, and long, ribbon-shaped caudicles. Unlike *Absolmsia*, *Madangia*, and *Micholitzia*, *Clemensiella* is much more morphologically divergent

from the core of *Hoya*, but is still phylogenetically similar to it.

Hoya ignorata possesses only a few common characters that link it to *Hoya*: it is a nonclimbing epiphyte from a habit rarely observed in *Hoya* and probably overlooked, since other new species with this habit have recently been described (Rodda et al., in prep.; Rodda & Simonsson, 2011b). The new taxon presents perennial inflorescences; the seeds are comose, spindle-shaped and lack differentiated margins; the pollinia have a distinct pellucid germination zone. The corona is completely different from that of all *Hoya* species described so far: the corona lobes are entirely missing and the guide rails, often depressed between the ridges of the corona lobes, here are prominent and elevated above all other corona parts, but still much reduced in size. At the tip of these is the minuscule retinaculum from which two pendulous pollinia are attached, via two long, ribbon-shaped caudicles. The retinaculum and caudicles of *H. ignorata* are very similar to those of the two species formerly belonging to *Clemensiella*: *H. mariae* (Schltr.) L. Wanntorp & Meve and *H. omlorii* (Livsh. & Meve) L. Wanntorp & Meve (Wanntorp & Meve, 2011).

It is apparent that various *Hoya* species present uncommon morphologies for the genus and the assignment of *H. ignorata* to the genus can be therefore justified. *Hoya ignorata* presents a combination of uncommon characters already observed in other *Hoya* species such as nonclimbing habit and long, ribbon-shaped caudicles. The lack of corona lobes and pendulous pollinia is so far unseen in *Hoya*. The presence of pendulous pollinia is often the only character that has distinguished the Asclepiadeae from Marsdenieae (Bruyns & Forster, 1991) and will have to be reconsidered in light of the publication of *H. ignorata*.

Due to the unique morphology of *Hoya ignorata* it is impossible to compare it to similar *Hoya* species. Only *H. minutiflora* Rodda & Simonsson (2010) presents flowers of a comparable small size, but can be easily separated because it is a climbing epiphyte whose flowers present bilobed corona lobes. Morphological comparison between *H. ignorata* and other Asian *Hoya* species presenting divergent morphologies is presented in Table 1.

Paratypes. MALAYSIA. **Sabah:** Nabawan, 300 m.s.m., 13 June 2011, M. Rodda & L. Gokusing MRII-056 (SING). **Terengganu:** Kenaman, Bukit Kajang, 150 m.s.m., 6 Nov. 1935, E. H. J. Corner 30279 (SING). THAILAND. **Nakhon Si Thammarat:** Khao Luang, 800 m.s.m., 5 May 2010, N. Simonsson & S. Somadee NS10-004 (SING), 810 m.s.m., 6 May 2010, N. Simonsson & S. Somadee NS10-007 (SING).

Table 1. Morphological comparison of *Hoya ignorata* with *H. inflata* (P. I. Forst., Liddle & I. M. Liddle) L. Wanntorp & P. I. Forst., described from Madang, Papua New Guinea, *H. manipurensis* Deb from Manipur, India, *H. spartioides* (Benth.) Kloppenb. from Borneo, Malaysia, and *H. mariae* (Schltr.) L. Wanntorp & Meve from the Philippines.

	<i>H. ignorata</i>	<i>H. inflata</i>	<i>H. manipurensis</i>	<i>H. spartioides</i>	<i>H. mariae</i>
Habit	epiphytic shrub	epiphytic climber	epiphytic shrub	epiphytic shrub	epiphytic climber
Corona lobes	missing	present	present	present	present
Pollinaria orientation	pendulous	erect	almost horizontal	erect	erect
Pellucid margin	present	present	present	present	missing
Pollinia shape	round	oblong	almost squared	square	clavate
Caudicles	long, ribbon-shaped	unwinged, flattened	unwinged, flattened	short, winged	long, ribbon-shaped
Retinaculum	small, narrow, oblong	oblong-ovate	rhomboid	almost round	small, narrow, oblong

VIETNAM. **Nghê An:** Co Ba, Ke Nhe, 14 May 1914, *J. F. Fleury* 32504 (P).

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